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ABSTRACT

The effects of an advance organizer, a preview of text structure, and two different arrangements of reading material on prose learning and on delayed retention were investigated. The textual material was preceded by an advance organizer, a preview of structure, or a neutral control passage. The narrative text, which concerned the economic geography of the Soviet Union, had either a hierarchical or a hierarchical and categorical structure. Subjects were 120 high school seniors from a Catholic girls' school. Results indicated that groups reading the advance organizer and either textual structure showed greater learning than control subjects: this effect was replicated eight days later for advance organizer plus hierarchically and categorically structured text, but not for advance organizer plus hierarchically structured text. The preview of reading text structure significantly affected learning for students reading hierarchically and categorically structured text. Results also indicated that students learned and retained significantly more superordinate than subordinate concepts. (Author/GDC)

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# THE EFFECTS OF AN ADVANCE ORGANIZER, TEXT STRUCTURE, AND A PREVIEW OF STRUCTURE ON THE LEARNING AND RETENTION OF PROSE MATERIAL

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ABSTRACT

The effects of an advance organizer, a preview of text structure and two arrangements of text material on prose learning and delayed retention were investigated. Text material was preceded by either an advance organizer, a preview of structure, or a neutral control passage. Two text structures were developed: 1) a hierarchical structure; 2) a hierarchical and categorical structure. Subjects were 120 female high school seniors. Groups reading an advance organizer and either text structure performed significantly better than control subjects for learning. This effect was replicated after an eight-day interval for students reading an advance organizer and hierarchically and categoricaaly structured text but not for students reading an advance organizer and hierarchically structured text. The preview of structure significantly affected learning for students reading hierarchically and categorically structured text. In addition, students learned and retained significantly more superordinate than subordinate ideas contained in the material.

## OBJECTIVES

The purpose of the study is to evaluate the effectiveness of an advance organizer, a preview of text structure, and two arrangements of text material on prose learning and delayed retention. Three specific questions are of concern: 1) How will an advance organizer and text structure interact to affect prose learning and retention? 2) How will a preview of structure and text structure interact to affect prose learning and retention? and 3) Will prose learning and retention be better for superordinate or subordinate ideas?

In order to answer these questions two text structures were developed: 1) a hierarchical structure; and 2) a hierarchical and categorical structure. In addition, an expository advance organizer, a preview of structure, and a neutral control passage were also constructed.

## THEORETICAL FRAMEWORK

David P. Ausubel (1963) argues that existing cognitive structures facilitate learning because they form a conceptual base for the integration of new material. New ideas and information are learned only to the extent to which more inclusive and appropriately relevant concepts are already available in the cognitive structure. In order to facilitate meaningful learning, Ausubel advocates the use of advance organizers.

Advance organizers refer to instructional materials which are introduced prior to new material to be learned. They are presented at a higher level of abstraction, generality and inclusiveness than the learning task itself and operate by providing the learner with the relevant superordinate concepts to which subsequent subordinate information can be meaningfully related.

The preview of structure gives explicit knowledge of the structure of the prose passages. It serves as a foreground or context for comprehending what comes next and provides the learner with a potentially effective organizational strategy. Research by Eggen, Kauchak & Kirk (1978) indicates that even when students are presented with structured text material they may be unaware of the text structure and unable to benefit from it. These investigators found that

students provided with a relevant conceptual hierarchy showed significantly better comprehension of text material than control subjects not receiving hierarchical cues.

While many investigators have found facilitating effects with advance organizers (i.e. Kuhn & Novak, 1970: West & Fensham, 1976; Lawton, 1977); others have not (i.e. Graber, Means & Johnston, 1972; Clawson & Barnes, 1973; Schumacher, Liebert & Fass, 1975). Clearly organizers can be effective under some conditions. The task is to clarify the function of organizers and to indicate precisely under what conditions they will be effective.

One condition which may affect the outcome of advance organizer research is the structure of the learning material itself. The structure of a passage is a very significant variable affecting what is remembered from prose passages (Frase, 1968, 1969, 1973; Meyer & McConkie, 1973; Miller, Perry & Cunningham, 1977). Yet very few investigators have given adequate consideration to the structure of the learning materials used with an advance organizer.

Ausubel (1963) contends that learning material should proceed from regions of greater inclusiveness to regions of lesser inclusiveness. In this way, detailed or specific information is always preceded by a more general or inclusive proposition to which it can be related. Hierarchically structured prose conforms to Ausubel's specifications.

In contrast, other textbook writers have structured prose hierarchically and categorically. Information is first grouped around related conceptual headings and then arranged from the general to the specific within each category. Johnson (1970), Meyer & McConkie (1973), Kintsch (1974), Miller, Perry & Cunningham (1977) and others have shown that memory for prose can be characterized within a hierarchical framework. The higher or the more important the material is in the hierarchy, the better the chance of recalling that information. Thus, the more superordinate ideas in a passage are recalled more frequently than subordinate ideas.

This research assumes that hierarchically structured prose conforms to the natural ordering of ideas in the learner's cognitive structure. We can predict

that the more the structure of the material to be learned conforms to the natural ordering of ideas in cognitive structure, the greater the likelihood of its being recalled.

The following major hypotheses were proposed: Effects of text structure. 1) Students reading a prose passage which is hierarchically structured will learn and retain significantly more of the material than students reading a prose passage which is both hierarchically and categorically structured. Advance organizer effects. 2) Students reading a prose passage which is hierarchically structured will benefit significantly more from the use of an advance organizer than students reading a prose passage which is both hierarchically and categorically structured. 3) Students reading a hierarchically structured prose passage will learn significantly more if the passage is preceded by an advance organizer than if it is preceded by a neutral control passage of similar length. 4) Students reading a hierarchically and categorically structured prose passage will learn significantly more if the passage is preceded by an advance organizers than if it is preceded by a neutral control passage of similar length. Effects of a preview of structure. 5) Students reading a hierarchically structured prose passage will learn significantly more if the passage is preceded by a preview of structure than if it is preceded by a neutral control passage. 6) Students reading a prose passage which is both hierarchically and categorically structured will learn significantly more if the passage is preceded by a preview of structure than if it is preceded by a neutral control passage. Superordinate vs. subordinate recall. 7) Students reading a hierarchically structured prose passage will learn significantly more of the superordinate ideas contained in the material than the subordinate ideas. 8) Students reading a prose passage which is both hierarchically and categorically structured will learn significantly more of the superordinate ideas contained in the material than the subordinate ideas. A parallel set of hypotheses was proposed for delayed retention as well.

## METHODS

Materials. A 373-word expository advance organizer was constructed following

Ausubel's guidelines. Its effectiveness was compared with a 61-word preview of structure and a 373-word historical narrative, written at the same level of generality as the learning passage itself and serving as a control. Two 1215-word prose passages were constructed. They differed only in the hierarchical arrangement of sentences, which were written at various levels of generality and inclusiveness. In one passage, the material was arranged both hierarchically and categorically. In the other passage the material was arranged to form only a hierarchical structure. In the hierarchical structure, the most inclusive statements are always presented first followed by the more specific ideas. In contrast, a hierarchical and categorical structure is present when textual information is first divided into categories and then arranged from the general to the specific within each category. The subject matter for the study was economic geography of the Soviet Union. Four levels of specificity were represented in the structure of the textual material.

Subjects & Procedure. The subjects were 120 seniors attending an all girls' Catholic high school in suburban Maryland, middle-class, and representing a wide range of ability. They were randomly assigned to one of six treatment conditions: 1) advance organizer, hierarchical and categorical text material; 2) advance organizer, hierarchical text material; 3) preview of structure, hierarchical and categorical text material; 4) preview of structure, hierarchical text material; 5) historical narrative, hierarchical and categorical text material; 6) historical narrative, hierarchical text.

The experiment was run in each of two classrooms for fifty minutes. Each student received a booklet containing the appropriate pre-instructional treatment and type of structure. Students were given ten minutes to read and study the pre-instructional treatment and fifteen minutes to read the passage. A 30-item multiple-choice test measuring knowledge and comprehension was given immediately following reading as a test of learning, and 8-days later as a test of retention. This text was developed based on an item analysis. In addition, superordinate versus subordinate learning and recall was measured for each treatment condition.

## DATA SOURCE

Hypotheses 1 through 6 were analyzed by a 2 (hierarchical & categorical structure, hierarchical structure) x 3 (advance organizer, preview of structure, historical narrative) x 2 (class 1, class 2) analysis of variance with the dependent variable being the total post-test score. Specific mean comparisons were made using the Tukey post hoc strategy. An identical analysis was used on the retention data, with the total retention score being the dependent variable. Hypotheses 7 and 8 were assessed by dividing the text into three subscales, each consisting of 10 questions, and measuring learning at one of three levels of specificity. A 2 x 3 x 2 x 3 repeated measures design was used with the three subscale means as the dependent variables for the learning data. An identical analysis was used on the retention data.

## RESULTS & CONCLUSIONS

Advance Organizer Effects. Students reading hierarchically structured prose learned significantly more when the passage was preceded by an advance organizer than when it was preceded by a neutral control passage. This effect was not replicated after an eight-day interval. Students reading hierarchically and categorically structured prose learned significantly more when the passage was preceded by an advance organizer. This effect was replicated after an eight-day interval. Thus, an advance organizer proved effective for both text structures for learning and was effective only with the hierarchical and categorical structure at retention. Therefore, hypotheses 3 and 4 were confirmed for learning. Hypothesis 4 was also confirmed for retention as well.

The results are supportive of Ausubel's theory, specifically the use of advance organizers with structured prose material. This research leads to the view that text structure works with an advance organizer to enable the learner to more thoroughly process text information and provides him/her with a more effective retrieval scheme. In this view, organizers cannot be expected to compensate for lack of inherent text structure. This view is in contrast to that of researchers such as Mayer (1978) who predict that there should be no positive effect of advance organizers for logical oranizations.

Effects of Text Structure. Students reading a hierarchically structured prose passage did not learn and retain significantly more of the material than students reading a hierarchically and categorically structured passage. Thus, hypothesis 1 was not confirmed. These results, when coupled with the positive organizer effects for both text structures, suggest that the learner organizes and stores information both hierarchically and categorically. Both organizational schemes are therefore of potential benefit to the learner.

Effects of a Preview of Structure. Text structure proved to be most important when used with a preview of structure. A planned comparison of means revealed a significant difference at .05 per comparison error rate for the hierarchical and categorical structure between the preview of structure and the neutral control ($F=4.48$, $p<.05$) thus confirming hypothesis 6. This result was not replicated for the retention data possibly because students were unable to remember the preview after the eight-day retention interval. Had students reading hierarchically and categorically structured prose been able to read the preview of structure prior to retesting they may well have benefited from its use. The preview may well act as a set of retrieval cues. Furthermore, students reading hierarchically structured prose did not benefit from a preview of structure either during learning or retention. Thus, support was not found for hypothesis 5.

These results indicate that a preview of structure giving explicit knowledge of the structure of prose passages can be a potent aid for learning when used with hierarchically and categorically structured text material. When students read hierarchically and categorically structured prose, information processing demands are high, i.e. students were required to process information presented in the form of five parallel hierarchies, one for each of five economic regions which are further subdivided into four categories, and then arranged from the general to the specific. Processing demands are lower when prose is only hierarchically structured, since the reader encounters a continuous flow of information proceeding from the superordinate to the subordinate. This result suggests that a preview of structure is likely to prove effective when used with text material following more than

one organizational scheme.

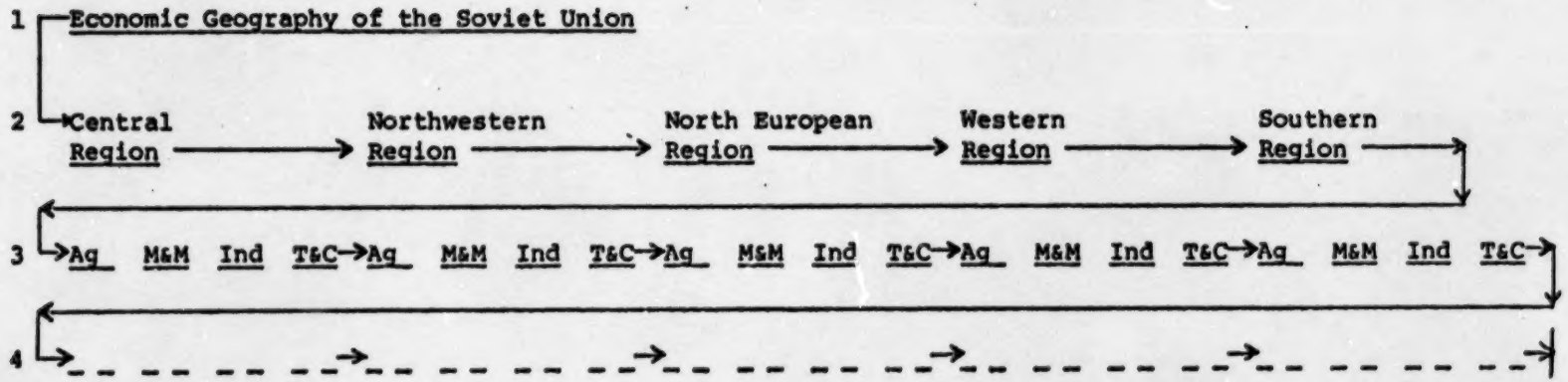
Superordinate vs. Subordinate Recall. Confirmation was found for hypotheses 7 and 8. Students reading hierarchially structured prose learned and retained significantly more of the superordinate ideas contained in the material than the subordinate ideas. Similarly, students reading hierarchically and categorically structured prose learned and retained significantly more of the superordinate ideas contained in the material. A close look at the hierarchical presentation of text information in studies finding significantly better student learning for superordinate concepts suggest that one is likely to find a superordinate recall advantage when information is arranged into one tall hierarchy, with a limited amount of propositions at each level as was the case with the hierarchical structure used in this study. The results of this study further our understanding of prose learning by showing that flatter and broader hierarchical text presentations (i.e. hierarchical and categorical structure) may also yield a superordinate recall advantage.

## IMPORTANCE

Results of the present study support Ausubel's theory by showing an advance organizer to be effective with hierarchically structured text material and furthers our understanding of prose learning and memory by: 1) showing an advance organzier to be effective with text structured both hierarchically and categorically; and 2) by indicating that a preview of structure has a positive effect on students' ability to organize and process text information.

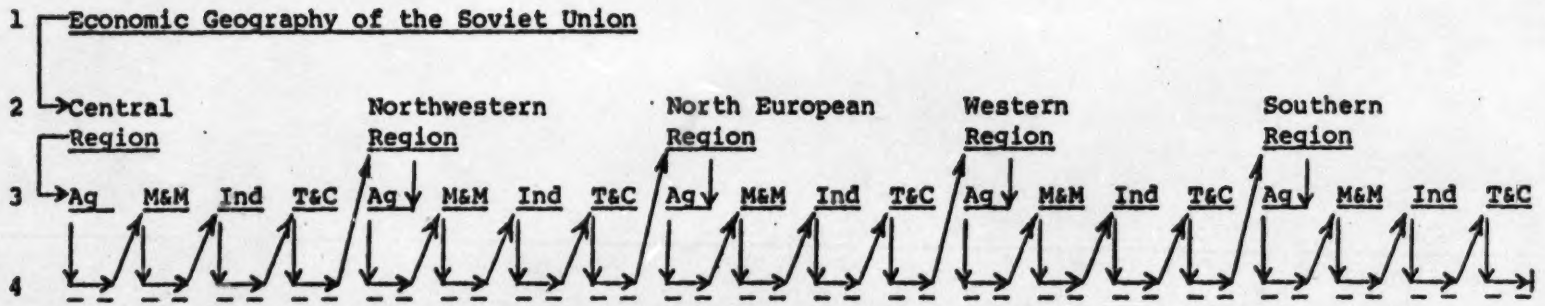
## DIRECTION OF DISCOURSE

## $A_2$ - HIERARCHICAL STRUCTURE



## DIRECTION OF DISCOURSE

## $A_1$ - HIERARCHICAL AND CATEGORICAL STRUCTURE



REFERENCES


Ausubel, D.P. The Psychology of Meaningful Verbal Learning. New York: Grune & Stratton, 1963.

Clawson, E.V. & Barnes, B.R. The effects of organizers on the learning of structured anthropology materials in the elementary grades. Journal of Experimental Education. 1973, 42, 11-15.

Frase, L.T. Cybernetic control of memory while reading connected discourse. Journal of Educational Psychology. 1968, 60, 49-55.

Frase, L.T. Paragraph organization of written materials. Journal of Educational Psychology. 1969, 60, 394-401.

Frase, L.T. Integration of written text. Journal of Educational Psychology. 1973, 65, 252-261.

Graber, R.A., Means, R.S. & Johnston, T.D. The effects of subsuming concepts on student achievement of unfamiliar science learning material. Journal of Research in Science Teaching, 1972, 9, 277-279.

Johnson, R.E. Recall of prose as a function of the structural importance of the linguistic units. Journal of Verbal Learning and Verbal Behavior. 1970, 9, 12-20.

Kintsch, W. The Representation of Meaning in Memory. Hillsdale, N.J.: Erlbaum, 1979.

Kuhn, D.J. & Novak, J.D. A Study of varying modes of topical presentation in elementary college biology to determine the effect of advanced organizers in knowledge acquisition and retention. Journal of Research in Science Teaching. 1970, 7, 249-253.

Lawton, J.T. Effects of advance organizer lessons on children's use and understanding of the causal and logical "because". The Journal of Experimental Education. 1977, 46, 41-46.

Meyer, B.J.F. & McConkie, G.W. What is recalled after hearing a passage? Journal of Educational Psychology. 1973, 65, 109-117.

Miller, R.B., Perry, F.L. & Cunningham, D.J. Differential forgetting of superordinate and subordinate information acquired from prose material. Journal of Educational Psychology, 1977, 69, 730-735.

Schumacher, G.,Liebert, D. & Fass, W. Textual organization, advance organizers and the retention of prose material. Journal of Reading Behavior. 1975, 7, 173-80.

West, L.H. & Fensham, P.J. Prior knowledge of advance organizers as effective variables in chemical learning. Journal of Research in Science Teaching. 1976, 13, 297-306.